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(54) Title: USE OF METATHESIS PRODUCTS OF FISCHER-TROPSCH PROCESS PRODUCTS

(57) Abstract: The invention provides oxo-alcohols, alkyl benzenes, and drilling fluid compositions derived from hydrocarbons derived by metathesis of Fischer-Tropsch hydrocarbons.

USE OF METATHESIS PRODUCTS OF FISCHER-TROPSCH PROCESS PRODUCTS

Field of the Invention

The invention relates to alkyl benzene (AB), drilling fluid and oxo-alcohols.

Background to the Invention

Conversion of lower olefins to higher olefins can be achieved by an isomerizing metathesis process, or metathetic oligomerisation. Conventional metathesis processes require an olefinic feedstock high in purity and linearity and produce highly linear products.

Various heterogeneous contact catalysts such as WO_3/SiO_2, Re_2O_7/Al_2O_3 and $Re_2O_7/Al_2O_3.SiO_2$, and also combinations of these catalysts with co-catalysts can be used for metathesis of unfunctionalized olefins. However, other catalyst and co-catalyst combinations, for example for homogeneous metathesis using WCl_6 and/or $ReCl_6$ and a co-catalyst, have been used successfully and the invention is not limited to any specific catalyst system, nor to homogeneous or hetergeneous metathesis.

Surprisingly, and contrary to conventional thinking, it has now been found that by using metathesis on Fischer-Tropsch process products i.e. using Fischer-Tropsch feedstock to the metathesis process, which feedstock includes both branched and unbranched olefins, as well as non-olefinic components, specific hydrocarbons having from 8 to 18 carbons can be obtained, which hydrocarbons may be used to derive AB, oxo-alcohols and drilling fluid.

By a Fischer-Tropsch process product or feedstock is meant a product obtained by subjecting a synthesis gas including carbon monoxide and hydrogen, to Fischer-Tropsch reaction conditions in the presence of typically an iron based catalyst, a cobalt based catalyst, and iron/cobalt based catalyst, or any other Fischer-Tropsch catalyst, under Fischer-Tropsch reaction conditions.

Summary of the Invention

This invention provides products in the 8 to 18 carbon range derived from 5 to 10 carbon Fischer-Tropsch process products, the products in the 8 to 18 carbon range having a desirable degree of branching or non-linearity.

Thus, according to a first aspect of the invention, there is provided an oxo-alcohol composition including oxo-alcohols having from 8 to 18 carbon atoms, the oxo-alcohols being derived from olefins obtained by metathesis of one or more of 5, 6, 7, 8, 9 and/or 10 carbon containing Fischer-Tropsch derived feedstock.

Between 10% and 99% of the oxo-alcohols of the composition may be branched oxo-alcohols, typically between 10% and 90%.

The oxo-alcohols of the composition may be predominantly linear, with between 10% and 49% branched oxo-alcohols in the composition.

The composition includes between 15% and 35% branched oxo-alcohols.

The composition includes 24% branched oxo-alcohols.

The branching on the branched oxo-alcohols is predominantly mono-methyl branching, however, some di-methyl branching may also be present.

Typically, the mono-methyl branching will be in excess of 90% of the branching, or even in excess of 95%.

The branching may be predominantly on the C4+ carbon, with some branching present on the C2 carbon.

The branching is typically over 70% on the C4+ carbons.

The branching may exceed 90% on the C4+ carbons.

Typically, the oxo-alcohols of the composition in the 8 to 10 carbon range are usable as plasticizer alcohols.

Typically, the oxo-alcohols of the composition in the 10 to 16 carbon range are usable as detergent alcohols.

A typical product make up from the metathesis of a 7 carbon Fischer-Tropsch derived feedstock and suitable for deriving oxo-alcohols therefrom is set out in Table 1 at the end of the specification.

This product of Table 1 may typically be hydroformylated using a Co-EP catalyst, or any other suitable catalyst, to form predominantly linear alcohols, the ratio of linear to branched alcohols being related to the ratio of linear to branched product of the metathesis of the 7 carbon Fischer-Tropsch derived feedstock.

Thus, according to a second aspect of the invention, there is provided an alkyl benzene (AB) composition including AB having from 10 to 14 carbon atoms on the alkyl chain, the AB being derived from olefins obtained by metathesis of one or more of a 6,7 and/or 8 carbon containing Fischer-Tropsch derived feedstock.

The AB composition may contain between 10% and 90% of branched alkyl chain AB.

The AB composition may contain predominantly linear alkyl chain AB, with between 10% and 49% branched alkyl chain AB in the composition.

The composition includes between 15% and 35% branched alkyl chain AB.

The composition includes about 24% branched alkyl chain AB.

The branching on the branched alkyl chain of the AB is predominantly mono-methyl branching, however, some di-methyl and/or ethy branching may also be present.

Typically, the mono-methyl branching will be in excess of 90% of the branching, or even in excess of 95%.

The branching may be predominantly on the C4+ carbon, with some branching present on the C2 carbon.

The branching is typically over 70% on the C4+ carbons.

The branching may exceed 90% on the C4+ carbons.

A typical AB product make up produced from the products of metathesis of a 9 carbon Fischer-Tropsch derived feedstock is set out in Table 3 at the end of the specification.

The AB may be sulfonated to give an alkyl benzene sulfonate which may be used as a detergent. However, the AB composition itself may have uses such as for drilling fluids.

The product of Tables 3 and 4 was fractionated and a 10 to 14 carbon alkyl chain AB fraction was obtained having the following composition (represented as the linear internal olefin only):

Decenes	:	16.53%
Undecenes	:	27.96%
Dodecenes	:	26.19%
Tridecenes	:	4.71%
Tetradecenes	:	0.91%

Methyl branched internal olefins in the 10 to 14 carbon range make up most of the remainder.

Thus, according to a third aspect of the invention, there is provided a drilling fluid composition including hydrocarbons having from 14 to 18 carbon atoms, the hydrocarbons being derived from olefins obtained by metathesis of one or more of a 8, 9 and/or 10 carbon containing Fischer-Tropsch derived feedstock.

The hydrocarbons derived from olefins obtained by metathesis of one or more of a 8, 9 and/or 10 carbon containing Fischer-Tropsch derived feedstock may be internal olefins.

The drilling fluid composition may include between 10% and 90% branched hydrocarbons.

The hydrocarbons of the drilling fluid composition may be predominantly linear, with between 10% and 49% branched hydrocarbons in the composition.

The composition includes between 15% and 35% branched hydrocarbons.

The composition includes about 24% branched hydrocarbons.

The branching on the branched hydrocarbons is predominantly mono-methyl branching, however, some di-methyl and/or ethyl branching may also be present.

The branching may be predominantly on the C4+ carbon, with some branching present on the C2 carbon.

The branching is typically over 70% on the C4+ carbons.

The branching may exceed 90% on the C4+ carbons.

Typically, the mono-methyl branching will be in excess of 90% of the branching, or even in excess of 95%.

A typical product make up from the metathesis of a 9 carbon Fischer-Tropsch derived feedstock and suitable for deriving the drilling fluid composition is set out in Table 2 at the end of the specification.

The product of Table 2 was fractionated and a 14 to 17 carbon fraction was obtained having the following approximate composition (represented as both methyl branched and linear internal olefins):

Tetradecenes :	23.03%
Pentadecenes:	38.40%
Hexadecenes :	36.22%
Heptadecene :	2.35%

Detailed D scription f th Invention

Example 1 - Alkyl Benzene Example

An olefinic C_{11}/C_{12} and and a C_{13}/C_{14} olefininc metathesis product derived from metathesis of Fischer-Tropsch olefins, was used to alkylate benzene to produce alkyl benzenes (AB's) .

For the alkylation of benzene with the metathesis product, 1 mole of the metathesis olefins, 10 mole of benzene and 20 wt% based on the olefin mixture of a shape selective Beta - zeolite catalyst were added to a stainless steel autoclave. The autoclave was purged with N_2 and then charged to 1000 psig N_2. The mixture was stirred and heated to 170 - 190°C for 14 - 15 hours. It was then cooled and removed from the autoclave. The reaction mixture was filtered to remove the catalyst and the unreacted benzene was removed in vacuo using a rotary evaporator.

The product was sulfonated with an equivalent of chlorosulfonic acid using methylene chloride as solvent. The methylene chloride was distilled away. The sulfonated product was neutralized with sodium methoxide in methanol and the methanol was evaporated to give alkyl benzene sulfonate, sodium salt mixture.

The product mixture contained methyl and di-methyl branching on the alkyl chain portion of the AB. The phenyl group of the AB's was predominantly on the C2 carbon of the alkyl chain.

As shown in the accompanying Figures numbered I to XVI, the AB's obtained included:

I	1- methyldecyl benzene
II	1-pentylhexylbenzene
III	1-propyloctylbenzene
IV	1-butylheptyl benzene
V	1-ethylnonylbenzene
VI	1,1-dimethylnonylbenzene
VII	1,3- dimethylnonylbenzene
VIII	1,6,7-trimethyloctylbenzene

IX	1,4- dimethylnonylbenzene
X	1,5- dimethylnonylbenzene
XI	1,6- dimethylnonylbenzene
XII	1,7- dimethylnonylbenzene
XIII	1,8- dimethylnonylbenzene
XIV	1,1,3-trimethyloctylbenzene
XV	1,3,7-trimethyloctylbenzene
XVI	1,1,4-trimethyloctylbenzene

Example 2 - Hydroformylation Example

Three different carbon number cuts of a Fischer-Tropsch olefinic feed produced by metathesis i.e C_9/C_{10}, C_{11}/C_{12} and a C_{13}/C_{14} cuts, were batch hydroformylated to evaluate their suitability as detergent alcohol (DA) feed, on the basis of reaction rate and total olefin content. Compared to conventional Fischer-Tropsch olefinic feed, the metathesis feed generally exhibited a 25% greater hydroformylation rate and this together with the higher olefinic content (>90%) should lead to significant reductions in reactor size and distillation requirements. The linearity and n:iso ratio of the metathesis product is practically identical to that of the conventional olefinic feed derived product. Metathesis feedstock thus appears to be preferable to conventional olefininc feedstock for DA process.

Batch hydroformylation

100ml of, respectively, a C_9/C_{10}, a C_{11}/C_{12} and a C_{13}/C_{14} carbon number cut of metathesis product were exhaustively hydroformylated using a liganded cobalt catalyst. The reaction temperature was 170°C, the initial pressure 85 bar and the syngas $CO:H_2$ ratio was 2:1. In each case the pressure drop with time in the autoclave was measured (i) to calculate the initial hydroformylation rate and (ii) to calculate the gas consumption for complete olefin conversion (i.e. exhaustive hydroformylation). The cobalt-EP catalyst was used to catalyse the reaction as it results in rapid double-bond isomerisation enabling full utilisation of the internal double bonds in the metathesis feed.

The results of the batch experiments are summarised in Table 5 below.

Olefin cont nt: The olefin content of the metathesis feed was derived from the total gas consumption during the exhaustive hydroformylation studies. The total olefinic content of the metathesis feed was greater than 90%. This is significantly higher than that of conventional olefinic feed which is about 50%.

Hydroformylation rate: The hydroformylation rate was calculated from the initial pressure drop with time. While the intrinsic rate (i.e. the rate constant) of metathesis feed hydroformylation is slower than that of conventional olefinic feed hydroformylation, this is more than compensated for by the significantly higher olefin content of the metathesis feed. For both the C_9/C_{10} and the C_{11}/C_{12} fractions the metathesis feed exhibited a 25% faster apparent hydroformylation rate than the conventional olefininc feed while the hydroformylation rate of the metathesis feed C_{13}/C_{14} was a little slower than that of a similar conventional olefinic feed. The slower intrinsic hydroformylation rate of the metathesis feed is most probably due to the greater number of internal olefins. Significant double bond isomerisation thus has to take place before hydroformylation can take place at the terminal position.

Linearity and n:iso ratio: The linearity and the n:iso ratio of the metathesis product was comparable to that of the conventional olefinic feed product. The supposed greater number of internal double bonds in the metathesis feed did not negatively affect the linearity of the alcohol product as hydroformylation at the terminal double-bond is favoured above internal double bond hydroformylation.

Tabl 5. Results of batch hydroformylation experiments

Feed source Carbon number cut	Conventional C_{11}/C_{12}	Metathesis C_9/C_{10}	Metathesis C_{11}/C_{12}	Metatesis C_{13}/C_{14}
Olefin content* [mass% of feed]	50%	90%	97%	93%
Apparent hydroformylation rate [$mmol_{alcohol}$·$hour^{-1}$]	80	105	91	58
Hydroformylation rate constant, $k_{lumbed} = \frac{r_{apparent}}{[olefin]}$	32	22	20	16
Linearity [mass%]	51%	68%	63%	58%
n:iso Ratio [mol:mol]	5.1	5.8	5.4	6.2

* calculated assuming 10% hydroformylation as for conventional oefininc feed

Example 3 – Drilling Fluids

C_{16} Fischer-Tropsch internal olefins were obtained by metathesis and were useable as a drilling fluid composition.

The drilling fluid composition included about 75% internal linear olefins and about 25% internal branched olefins, which internal branched olefins were predominantly mono-methyl, di-methyl and ethyl branched.

The drilling fluid compositions in accordance with the invention had the following physical properties:

The properties are for a typical C_{12}-C_{16} internal linear and branch d combination of olefinic product made in accordance with the present invention:

Viscocity: 1-2 cSt @ 100'C
Flash point: >90'C
Linear:branch ratio 1:1 to 5:1
Pour Point: < 0'C

Examples of the internal olefins useful as drilling fluids include:

1) A drilling fluid including:
A linear component making up about 75.1% of the composition; and
A mono-methyl branched component making up about 24.9% of the drilling fluid composition.

2) A drilling fluid composition including:
A linear component of mainly hexadec-3-ene in amounts of between 2 and 40%, depending on process conditions; and
A mono-methyl branched component of between 60% and 98% of the drilling fluid composition.

Table 1: Mass and component balance of a batch reaction of water washed C7 cut

COMPONENT	FEED mass %	PRODUCT mass %
3-Me-1-hexene	1.0693	0.0000
5-Me-1-hexene	2.3655	0.0000
4-Me-1-hexene	3.8129	0.0000
2-Me-1-hexene	6.0078	0.2428
2-Methylhexane	1.6928	2.0457
3-Methylhexane	3.0273	3.3236
1-heptene	75.6871	0.9740
n-heptane	2.5700	2.3867
heptene (Z, E)	0.0000	0.0000
3-Heptene	0.9803	3.1209
diene or cyclic olefin	1.0121	0.0791
2-Heptene	0.0000	3.2820
Dienes or cyclic olefins	0.5094	0.0000
Ethylene		1.9997
Prophylene		3.4060
Butenes		3.6816
Pentenes		4.1432
Hexenes		7.2954
Methyl branced heptenes		1.3442
n-octenes		9.7463
n-Nonenes		7.4719
Methyl branced nonenes		1.4163
n-Decenes		9.2216
Methyl branced decenes		2.7138
n-undecenes		12.5128
Methyl branced undecenes		2.3198
n-dodecenes		12.0218
Methyl branced dodecenes		0.4282
tridecenes		2.9284
tetradecene		0.7476
pentadecene		0.1664
unknowns	1.2655	0.1664
Heavies		0.9803

Reaction Conditions in the above table:

MASS CATALYST (g)	51.81
MASS C7 FEED (g)	316.38
MASS PRODUCT (g)	280.55
mol me-hexenes + n-heptenes in	2.90
mol me-hexenes + n-heptenes out	0.26
heptene conversion	91.06
mol C10 – 14 formed	0.94
mol % yield	65.18
selectivity (%)	71.58

TABLE 2: Mass and component balance of the batch reaction acetonitrile washed .

COMPONENT	FEED mass %	PRODUCT Mass %
3-Me-1-octene	0.1407	0.0000
7+4-Me-1-octene	0.9809	0.0000
6-me-1-octene	0.9637	0.0000
2-Me-1-octene	0.8992	0.0000
4+2-Methyloctane	1.1467	1.4687
3-Methyloctane	1.5091	1.8279
n-nonenes	75.5614	15.3960
n-nonane	11.3149	13.3231
dienes/cyclic olefins	1.7378	1.1135
Ethylene		1.6064
Propylene		2.5809
Butenes		2.1397
Pentenes		1.3528
Hexenes		0.7844
Heptenes		1.4035
n-octenes		4.4380
n-Decenes		10.1435
n-undecenes		1.7770
n-dodecenes		1.5719
Tridecenes		3.5240
methyl branched C 13		0.0000
Tetradecene		7.5024
methyl branched C 14		0.6842
Pentadecene		12.9260
methyl branched C 15		0.7234
Hexadecene		12.8760
Heptadecene		0.8366
Unknowns	5.7457	0.8366

Reaction Conditions in the above table:

C9 : Re207	1000 : 1
MASS CATALYST (g)	0.75
MASS C9 FEED (g)	10.71
MASS PRODUCT (g)	9.99
mol me-octenes + n-nonenes in	0.07
mol me-octenes + n-nonenes out	0.01
nonene conversion	80.56
mol C14 – 18 formed	0.02
mol % yield	52.28
selectivity (%)	64.90

Table 3: Mass % of Components in Alkyl Benzene Product

Component	Mass%
Branched C_{10} benzene	0.51
Branched C_{10} benzene	0.12
Branched C_{10} benzene	0.14
Branched C_{10} benzene	0.20
Branched C_{10} benzene	0.29
Branched C_{10} benzene	0.39
5-Decylbenzene	2.91
4-Decylbenzene	2.79
Branched C_{10} benzene	0.17
Branched C_{10} benzene	0.76
3-Decylbenzene	4.34
Branched C_{10} benzene	0.25
Branched C_{10} benzene	0.82
Branched C_{11} benzene	1.23
2-Decylbenzene	6.87
Branched C_{11} benzene	0.70
Branched C_{11} benzene	0.57
Branched C_{11} benzene	0.88
5+6-Decylbenzene	7.95
Branched C_{11} benzene	0.52
4-Undecylbenzene	4.59
Branched C_{11} benzene	1.78
3-Undecylbenzene	8.49
Branched C_{11} benzene	1.10
Branched C_{12} benzene	0.41
Branched C_{12} benzene	0.93
2-Undecylbenzene	10.22
Branched C_{12} benzene	0.59
Branched C_{12} benzene	0.94
6-Dodecylbenzene	4.57
5-Dodecylbenzene	3.83
Branched C_{12} benzene	0.71
4-Dodecylbenzene	3.85
Branched C_{12} benzene	0.49
Branched C_{12} benzene	0.54
Branched C_{12} benzene	0.82
3-Dodecylbenzene	5.96
Branched C_{12} benzene	0.66
Branched C_{13} benzene	0.74
2-Dodecylbenzene	7.92
5+6-Tridecylbenzene	1.04
4-Tridecylbenzene	0.73
3-Tridecylbenzene	1.42
2-Tridecylbenzene	1.38
Branched C_{14} Benzenes	0.46
Branched C_{14} Benzenes	1.45
5+6-Tetradecylbenzene	0.50
4-Tetradecylbenzene	0.21
3-Tetradecylbenzene	0.51
2-Tetradecylbenzene	0.77

Table 4: Linear and Branched Analysis of Alkyl Benzene Product

Compon nt	%
C_{10}	
2-Decylbenzene	6.87
3-Decylbenzene	4.34
4-Decylbenzene	2.79
5-Decylbenzene	2.91
Total linear	16.90
Total branched	3.65
C_{11}	
2-Undecylbenzene	10.22
3-Undecylbenzene	8.49
4-Undecylbenzene	4.59
5+6-Undecylbenzene	7.95
Total linear	31.26
Total branched	6.78
C_{12}	
2-Dodecylbenzene	7.92
3-Dodecylbenzene	5.96
4-Dodecylbenzene	3.85
5-Dodecylbenzene	3.83
6-Dodecylbenzene	4.57
Total linear	26.13
Total branched	6.08
C_{13}	
2-Tridecylbenzene	1.38
3-Tridecylbenzene	1.42
4-Tridecylbenzene	0.73
5+6-Tridecylbenzene	1.04
Total linear	4.56
Total branched	0.74
C_{14}	
2-Tetradecylbenzene	0.77
3-Tetradecylbenzene	0.51
4-Tetradecylbenzene	0.21
5+6-Tetradecylbenzene	0.50
Total linear	1.98
Total branched	1.91

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Claims:

1. An oxo-alcohol composition including oxo-alcohols having from 8 to 18 carbon atoms, the oxo-alcohols being derived from olefins obtained by metathesis of one or more Fischer-Tropsch derived hydrocarbons selected from hydrocarbons having 5, 6, 7, 8, 9 and/or 10 carbon atoms.

2. An oxo-alcohol composition as claimed in claim 1, wherein between 10% and 99% of the oxo-alcohols of the composition are branched oxo-alcohols.

3. An oxo-alcohol composition as claimed in claim 1 or claim 2, wherein the oxo-alcohols of the composition are predominantly linear, with between 10% and 49% branched oxo-alcohols in the composition.

4. An oxo-alcohol composition as claimed in claim 3, wherein between 15% and 35% of the oxo-alcohols in the composition are branched oxo-alcohols.

5. An oxo-alcohol composition as claimed in claim 3, wherein 24% of the oxo-alcohols in the composition are branched oxo-alcohols.

6. An oxo-alcohol composition as claimed in any one of claims 2 to 5, wherein the branching on the branched oxo-alcohols is predominantly mono-methyl branching.

7. An oxo-alcohol composition as claimed in any one of claims 2 to 6, wherein the branching on the branched oxo-alcohols iincludes some di-methyl branching.

8. An oxo-alcohol composition as claimed in any one of claims 2 to 7, wherein the mono-methyl branching is in excess of 90% of the branching.

9. An oxo-alcohol composition as claimed in any one of claims 2 to 8, wherein the mono-methyl branching is in excess of 95% of the branching.

10. An oxo-alcohol composition as claimed in any one of claims 2 to 9, wherein the branching is predominantly on the C4+ carbons.

11. An oxo-alcohol composition as claimed in any one of claims 2 to 10, wherein some branching is present on the C2 carbon.

12. An oxo-alcohol composition as claimed in any one of claims 10 or 11, wherein the branching is over 70% on the C4+ carbons.

13. An oxo-alcohol composition as claimed in any one of claims 10 to 12, wherein the branching is over 90% on the C4+ carbons.

14. A plasticizer alcohol derived from at least a fraction of the oxo-alcohol composition as claimed in any one of the preceding claims, wherein the fraction includes hydrocarbons in the 8 to 10 carbon range.

15. A detergent alcohol derived from at least a fraction of the oxo-alcohol composition as claimed in any one of the preceding claims, wherein the fraction includes hydrocarbons in the 10 to 16 carbon range.

16. An alkyl benzene (AB) composition including AB having from 10 to 14 carbon atoms on the alkyl chain, the AB being derived from olefins obtained by metathesis of one or more Fischer-Tropsch derived hydrocarbons selected from hydrocarbons having 6, 7 and/or 8 carbon atoms.

17. An alkyl benzene (AB) composition as claimed in claim 16, which AB composition includes between 10% and 90% of branched alkyl chain AB.

18. An alkyl benzene (AB) composition as claimed in claim 16 or claim 17, wherein the AB composition includes predominantly linear alkyl chain AB, with between 10% and 49% branched alkyl chain AB in the composition.

19. An alkyl benzene (AB) composition as claimed in claim 18, wherein the composition includes between 15% and 35% branched alkyl chain AB.

20. An alkyl benzene (AB) composition as claimed in claim 18 or 19, wherein the composition includes 24% branched alkyl chain AB.

21. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 20, wherein the branching on the branched alkyl chain of the AB is predominantly mono-methyl branching.

22. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 20, wherein the branching on the branched alkyl chain of the AB includes di-methyl and/or ethyl branching.

23. An alkyl benzene (AB) composition as claimed in claim 21 or claim 22, wherein the mono-methyl branching is in excess of 90% of the branching.

24. An alkyl benzene (AB) composition as claimed in claim 21 or claim 22, wherein the mono-methyl branching is in excess of 95% of the branching.

25. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 24, wherein the branching is predominantly on the C4+ carbons of the alkyl chain of the AB.

26. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 25, wherein some of the branching is on the C2 carbon of the alkyl chain of the AB.

27. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 26, wherein the branching is in excess of 70% on the C4+ carbons of the alkyl chain of the AB.

28. An alkyl benzene (AB) composition as claimed in any one of claims 17 to 26, wherein the branching is in excess of 90% on the C4+ carbons of the alkyl chain of the AB.

29. A detergent composition including a sulfonated alkyl benzene as claimed in any one of claims 16 to 28.

30. A drilling fluid composition including an AB composition as claimed in any one of claims 16 to 28.

31. A drilling fluid composition including hydrocarbons having from 14 to 18 carbon atoms, the hydrocarbons being derived from olefins obtained by metathesis of one or more Fischer-Tropsch derived hydrocarbons selected from hydrocarbons having 8, 9 and/or 10 carbon atoms.

32. A drilling fluid composition as claimed in claim 31, wherein the hydrocarbons are internal olefins.

33. A drilling fluid composition as claimed in claim 31 or 32, which includes between 10% and 90% branched hydrocarbons.

34. A drilling fluid composition as claimed in any one of claims 31 to 33, wherein the hydrocarbons are predominantly linear.

35. A drilling fluid composition as claimed in claim 33 or 34, which composition includes between 10% and 49% branched hydrocarbons.

36. A drilling fluid composition as claimed in claim 33 or 34, which composition includes between 15% and 35% branched hydrocarbons.

37. A drilling fluid composition as claimed in claim 33 or 34, which composition includes 24% branched hydrocarbons.

38. A drilling fluid composition as claimed in any one of claims 33 to 37, wherein the branching on the branched hydrocarbons is predominantly mono-methyl branching.

39. A drilling fluid composition as claimed in any one of claims 33 to 38, which includes some di-methyl and/or ethyl branching.

40. A drilling fluid composition as claimed in any one of claims 33 to 39, wherein the branching is predominantly on the C4+ carbons of the alkyl chain of the AB.

41. A drilling fluid composition as claimed in any one of claims 33 to 40, which includes branching on the C2 carbon of the alkyl chain of the AB.

42. A drilling fluid composition as claim d in any one of claims 33 to 41, wherein the branching is in excess of 70% on the C4+ carbons of the alkyl chain of the AB.

43. A drilling fluid composition as claimed in any one of claims 33 to 42, wherein the branching is in excess of 90% on the C4+ carbons of the alkyl chain of the AB.

44. A drilling fluid composition as claimed in any one of claims 38 to 43, wherein the mono-methyl branching is in excess of 90% of the branching.

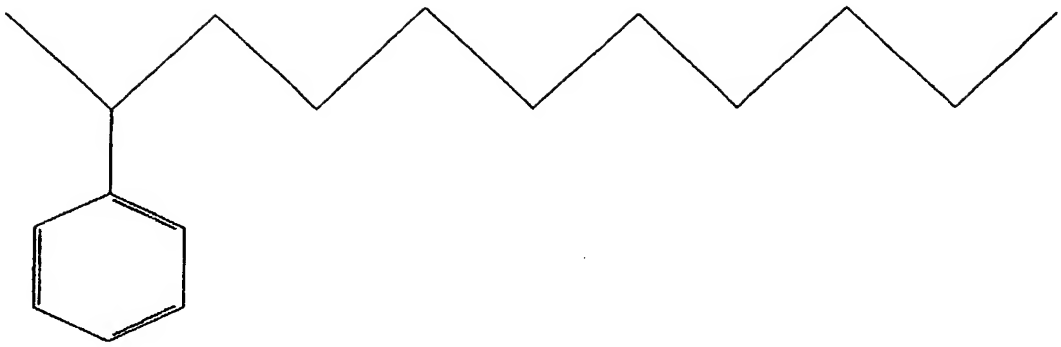
45. A drilling fluid composition as claimed in any one of claims 38 to 44, wherein the mono-methyl branching is in excess of 95% of the branching.

46. An oxo-alcohol composition, substantially as herein described and illustrated.

47. An alkyl benzene composition, substantially as herein described and illustrated.

48. A drilling fluid composition, substantially as herein described and illustrated.

49. A new oxo-alcohol composition, a new alkyl benzene composition, or a new drilling fluid composition substantially as herein described.



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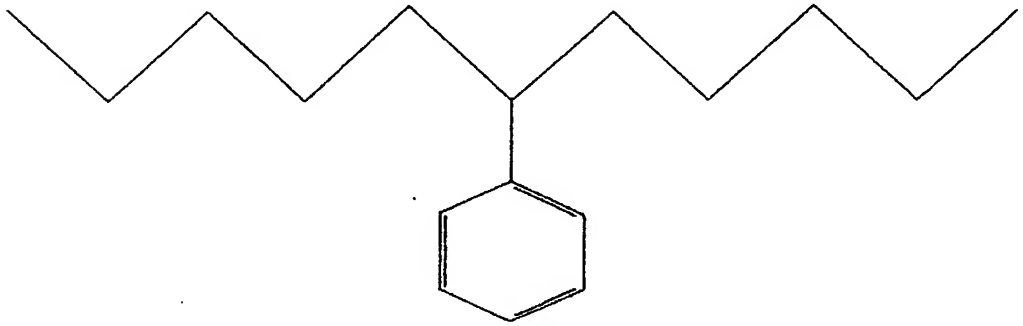

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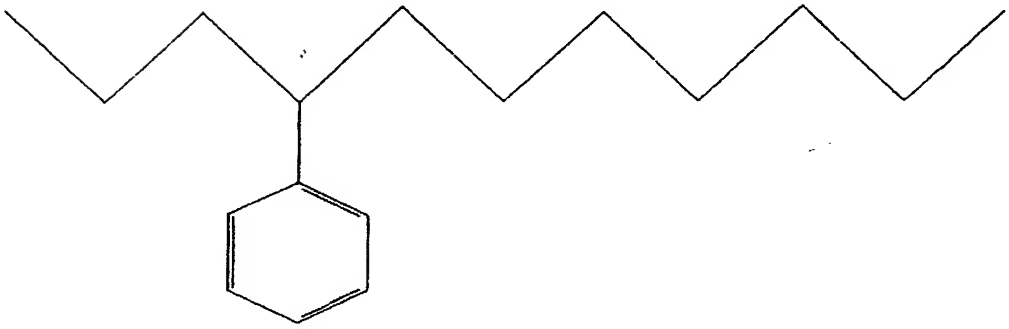

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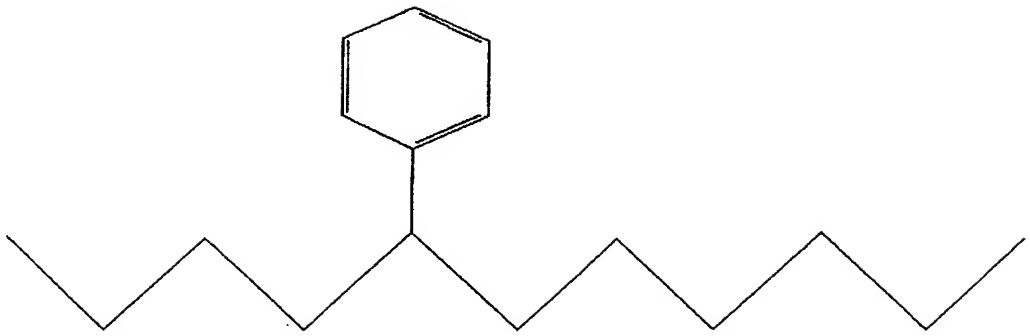

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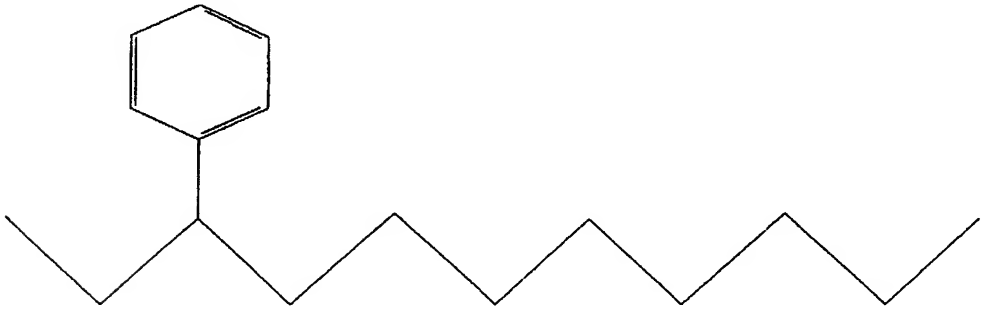

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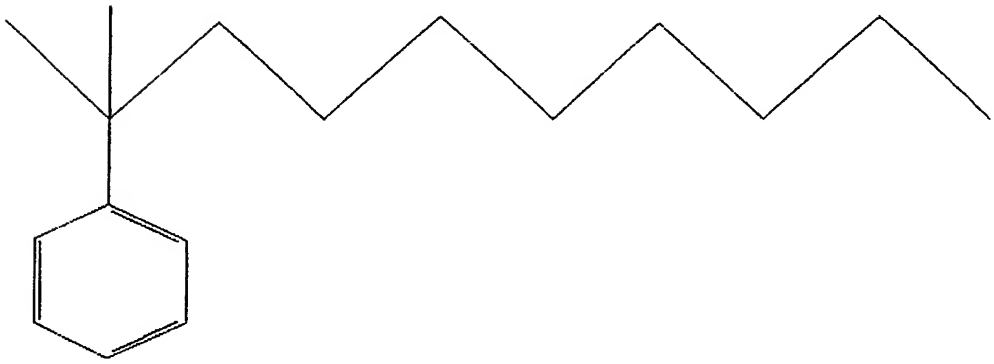

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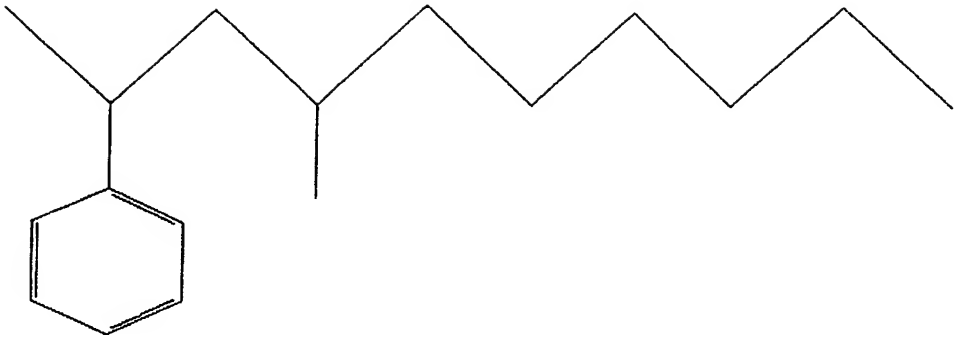

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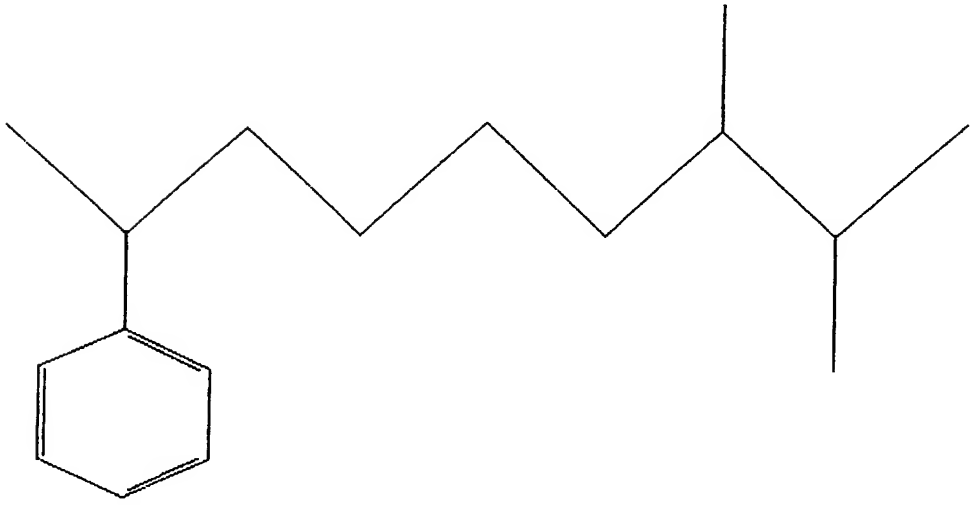

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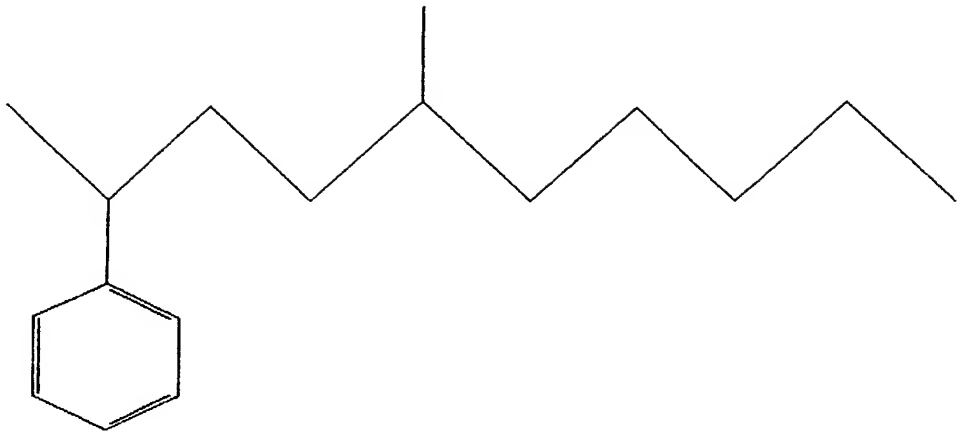

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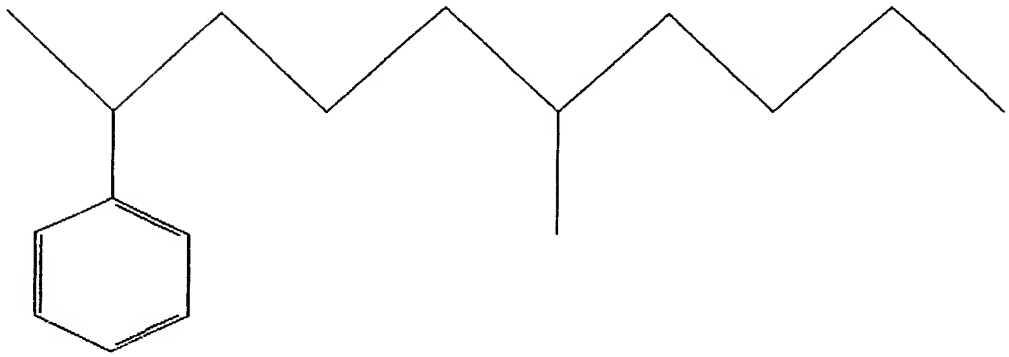

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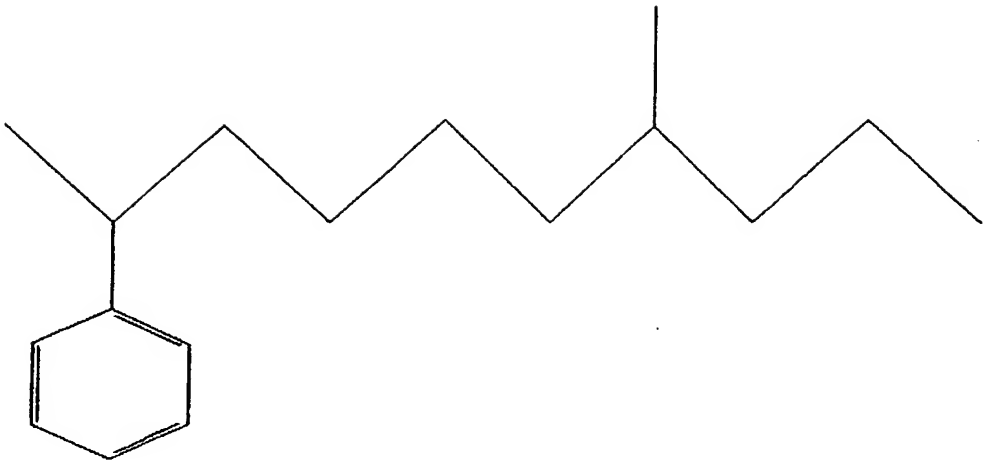

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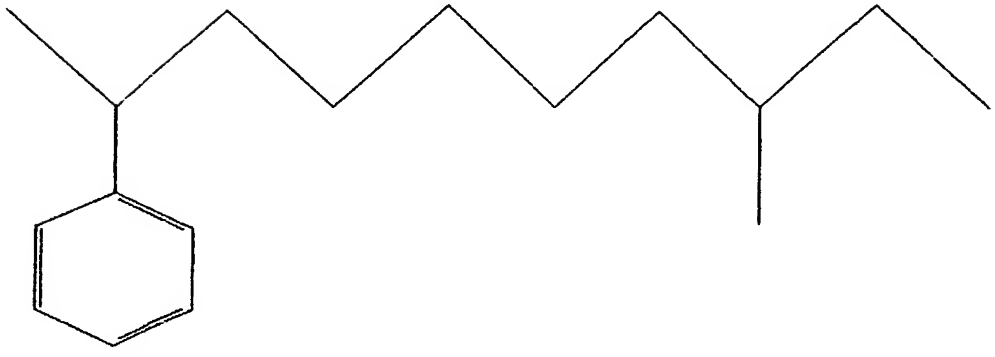

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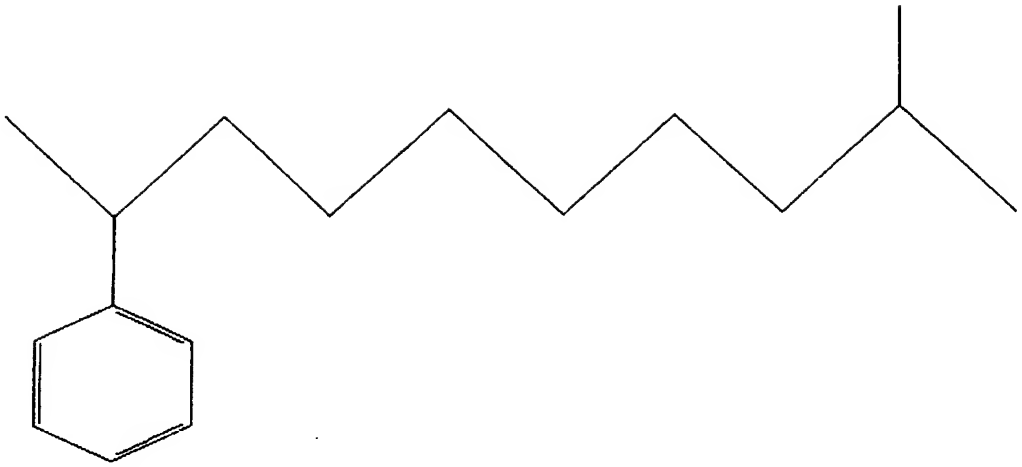

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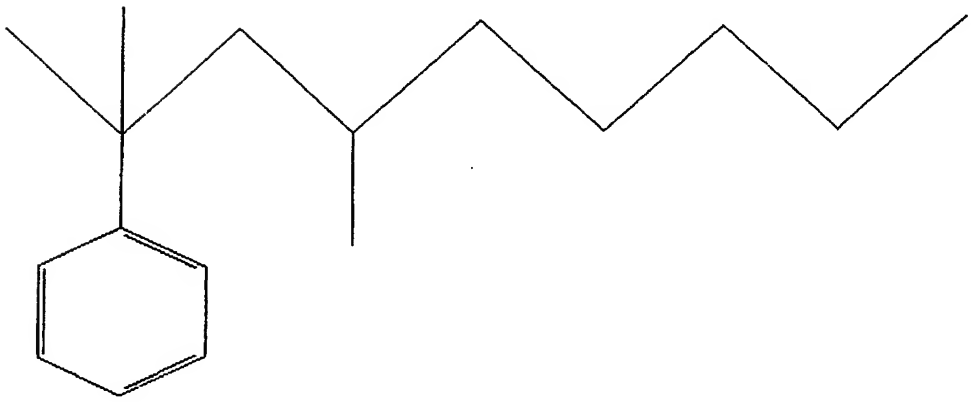

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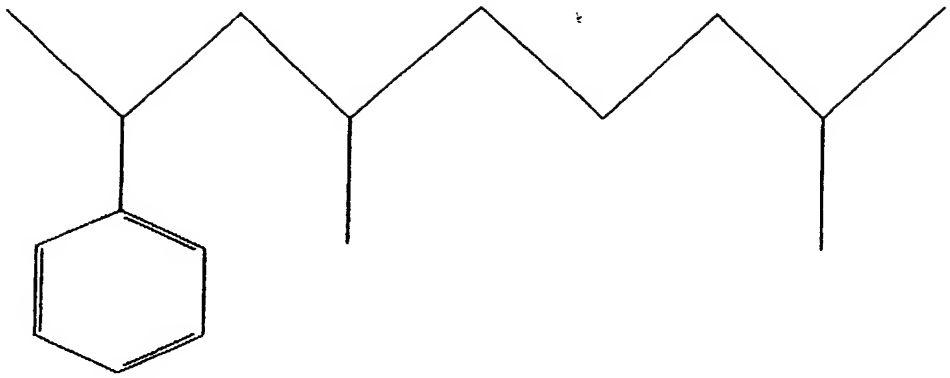

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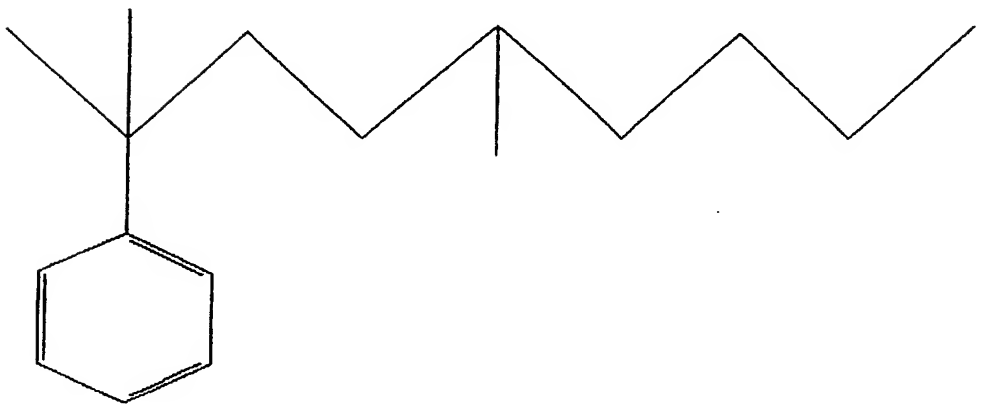

XVI

INTERNATIO SEARCH REPORT

Inten. Application No
PCT/ZA 00/00123

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07C29/16 C07C15/107 C09K7/06 C11D1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C07C C09K C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 97 39087 A (PROCTER & GAMBLE) 23 October 1997 (1997-10-23) page 23, line 19 -page 24, line 4	1,15
A	GB 2 258 258 A (DAVID BRANKLING) 3 February 1993 (1993-02-03) the whole document	16,30,31
E	EP 1 024 123 A (INST FRANCAIS DU PETROL) 2 August 2000 (2000-08-02) paragraph '0002!	16

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 November 2000	04/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	English, R

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No
PCT/ZA 00/00123

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9739087 A	23-10-1997	AU 2675497 A	07-11-1997
		AU 2734597 A	07-11-1997
		AU 2923197 A	07-11-1997
		AU 2991097 A	07-11-1997
		BR 9708678 A	03-08-1999
		BR 9708691 A	03-08-1999
		BR 9710429 A	17-08-1999
		BR 9710430 A	17-08-1999
		BR 9710431 A	17-08-1999
		BR 9710642 A	17-08-1999
		BR 9710655 A	17-08-1999
		CA 2252359 A	23-10-1997
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		CA 2252437 A	23-10-1997
		CZ 9803341 A	17-03-1999
		CZ 9803342 A	17-03-1999
		CZ 9803343 A	17-03-1999
		CZ 9803345 A	17-03-1999
		EP 0898606 A	03-03-1999
		EP 0906274 A	07-04-1999
		EP 0898607 A	03-03-1999
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		EP 0898609 A	03-03-1999
		EP 0898610 A	03-03-1999
		EP 0900181 A	10-03-1999
		HU 9901806 A	29-11-1999
		JP 3043434 B	22-05-2000
		JP 11507987 T	13-07-1999
		JP 11507955 T	13-07-1999
		JP 11507956 T	13-07-1999
		JP 2000503699 T	28-03-2000
		JP 2000508694 T	11-07-2000
		JP 2000503700 T	28-03-2000
		JP 11507957 T	13-07-1999
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		NO 984791 A	15-12-1998
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		WO 9739091 A	23-10-1997
		WO 9738957 A	23-10-1997
		US 6020303 A	01-02-2000
		US 6015781 A	18-01-2000
		US 6046152 A	04-04-2000
GB 2258258 A	03-02-1993	WO 9412589 A	09-06-1994
EP 1024123 A	02-08-2000	FR 2789072 A	04-08-2000

The demand must be filed directly with the competent International Preliminary Examining Authority. If two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference: PCT/ZA00/00123

International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/ZA00/00123	6 JULY 2000 (06/07/2000)	6 JULY 1999 (06/07/1999)

Title of invention

USE OF METATHESIS PRODUCTS OF FISCHER-TROPSCH PROCESS PRODUCTS

Box No. II APPLICANT(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Sasol Technology (Pty) Ltd
1 Sturdee Avenue
Rosebank
2196 Johannesburg
South Africa

Telephone No.:

Facsimile No.:

Teleprinter No.:

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

MORGAN, Dave, Hedley
2 Saligna Town Houses
Frans Oerder Street
1911 Vanderbijlpark
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

NASH, Robin, John
22 Heide Avenue
Flora Gardens
1911 Vanderbijlpark
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

[X] Further applicants are indicated on a continuation sheet.

International application No.
PCT/ZA00/00123

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

DE WET, Hester
24 Beethoven Street
1911 Vanderbijlpark
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

BOTHA, Jan, Mattheus
38 Billingham Street
9570 Sasolburg
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

KINDERMANS, Sybrandus
3 Van Staden Street
Vaalpark
9570 Sasolburg
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

SPAMER, Alta
60 Beefwood Street
SE3
1911 Vanderbijlpark
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

[X] Further applicants are indicated on another continuation sheet.

International application No.
PCT/ZA00/00123

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

NKOSI, Bongani, Simon
1 Waterkant Street
9570 Sasolburg
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

MBATHA, Muzikayise, Mthokozisi, Justice
No. 3 Tswelopele Flat
9571 Zamdela
South Africa

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
ZA	ZA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

☐ Further applicants are indicated on another continuation sheet.

International application No.
PCT/ZA00/00123

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is [X] agent [ ] common representative

and [X] has been appointed earlier and represents the applicant(s) also for international preliminary examination.

[ ] is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

[ ] is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

DUNLOP, Alan, J,S; WILLIAMS, Victor, C; CLELLAND, Sandra, L;
HAHN, Hans, H; LUTEREK, Janusz, F
HAHN & HAHN INC.
222 Richard Street, Hatfield
0083 Pretoria
South Africa

Telephone No.: (012) 3421774

Facsimile No.: (012) 3423027

Teleprinter No.:

[ ] **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination **to start on the basis of:**

[X] the international application as originally filed

the description [ ] as originally filed
[ ] as amended under Article 34

the claims [ ] as originally filed
[ ] as amended under Article 19 (together with any accompanying statement)
[ ] as amended under Article 34

the drawings [ ] as originally filed
[ ] as amended under Article 34

2. [ ] The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. [X] The applicant wishes the start of the international preliminary examination **to be postponed** until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)) *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

[X] which is the language in which the international application was filed.
[ ] which is the language of a translation furnished for the purposes of international search.
[ ] which is the language of publication of the international application.
[ ] which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby **elects all eligible States** *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes **not to elect:**

Sheet No. 5

International application No.
PCT/ZA00/00123

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:			For International Preliminary Examining Authority use only: received	not received
1. translation of international application	:	sheets	☐	☐
2. amendments under Article 34	:	sheets	☐	☐
3. copy (or, where required, translation) of amendments under Article 19	:	sheets	☐	☐
4. copy (or, where required, translation) of statement under Article 19	:	sheets	☐	☐
5. letter	: 1	sheets	☐	☐
6. other *(specify)*	:	sheets	☐	☐

The demand is also accompanied by the item(s) marked below:

1. [X] fee calculation sheet
2. [ ] separate signed power of attorney
3. [ ] copy of general power of attorney; reference number, if any:
4. [ ] statement explaining lack of signature
5. [ ] nucleotide and or amino acid sequence listing in computer readable form
6. [ ] other *(specify)*:

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

CLELLAND, Sandra, L (Agent)

4 OCTOBER 2000 (04/10/2000)

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):
3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

DUNLOP, Alan J.S.
HAHN & HAHN INC.
222 Richard Street
Hatfield
0083 Pretoria
AFRIQUE DU SUD

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	16.10.2001
Applicant's or agent's file reference PCT/ZA00/00123	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/ZA00/00123	06/07/2000	06/07/1999

Applicant
SASOL TECHNOLOGY (PTY) LTD. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Roche, S Tel.+49 89 2399-8031

Form PCT/IPEA/416 (July 1992)

CHAPTER II

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No. PCT/ZA00/00123	For International Preliminary Examining Authority use only
Applicant's or agent's file reference PCT/ZA00/00123	Date stamp of the IPEA

Applicant
SASOL TECHNOLOGY (PTY) LTD, et al

Calculation of prescribed fees

1. Preliminary examination fee	750 DEM	P
2. Handling fee *(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)*	71.25 DEM	H
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	821.25 DEM	TOTAL

Mode of Payment

☐	authorization to charge deposit account with the IPEA (see below)	☐	cash
☐	cheque	☐	revenue stamps
☐	postal money order	☐	coupons
☒	bank draft	☐	other *(specify)*:

Deposit Account Authorization *(this mode of payment may not be available at all IPEAs)*

The IPEA/ EP____ ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☐ *(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)* is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

Deposit Account Number _____ Date *(day/month/year)* _____ Signature _____

CHAPTER II

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No.	PCT/ZA00/00123
Applicant's or agent's file reference	PCT/ZA00/00123

For International Preliminary Examining Authority use only

Date stamp of the IPEA

Applicant: SASOL TECHNOLOGY (PTY) LTD, et al

Calculation of prescribed fees

1. Preliminary examination fee	750 DEM	P
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3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	821.25 DEM	TOTAL

Mode of Payment

- [ ] authorization to charge deposit account with the IPEA (see below)
- [ ] cheque
- [ ] postal money order
- [x] bank draft
- [ ] cash
- [ ] revenue stamps
- [ ] coupons
- [ ] other *(specify)*:

Deposit Account Authorization *(this mode of payment may not be available at all IPEAs)*

The IPEA/ EP_____ [ ] is hereby authorized to charge the total fees indicated above to my deposit account.

[ ] *(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)* is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

Deposit Account Number _____ Date *(day/month/year)* _____ Signature _____

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
PCT/ZA00/00123		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/ZA00/00123	06/07/2000	06/07/1999
International Patent Classification (IPC) or national classification and IPC C07C29/16		
Applicant SASOL TECHNOLOGY (PTY) LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☐ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04/10/2000	16.10.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Grammenoudi, S Telephone No. +49 89 2399 8324

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/ZA00/00123

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-14 as originally filed

Claims, No.:

1-49 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

   ☒ the entire international application.

   ☐ claims Nos. .

because:

   ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

   ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
   see separate sheet

   ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

   ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

   ☐ the written form has not been furnished or does not comply with the standard.

   ☐ the computer readable form has not been furnished or does not comply with the standard.

SECTION III

D1= WPI / DERWENT, AN 1992-289071
D2 US-A-3 725 288
D3= DE-A-2 537 700
D4= US-A-3439050
D5= US-A-6010998
D6= GB-A-2 258 258

1. A claim relating to compositions can only be regarded as clear if it is possible to establish with absolute certainity within a reasonable time whether any single composition falls within the scope of the claim. Present claims 1-45, defining compositions by a product-by-process terminology, completely fail to meet this indispensable criterion. The skilled person is not capable of specifying exactly the oxo-alcohols which are embraced by the definition *"having from 8 to 18 carbon atoms, the oxo-alcohols being obtained by metathesis of one or more Fischer-Tropsch derived hydro-carbons selected from hydrocarbons having 5, 6, 7, 8 and/or 10 carbon atoms"* as compared to those which are not . Claims 1-45 therefore place an undue burden on those seeking to establish the extent of the protection. Therefore the requirements of Art. 6 PCT are not met.

2. In view of the above clarity objection it is not at present possible to carry out a full examination of the application.

3. Claims 46-49 contain no technical features but references to the description. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here.

PA NT COOPERATION TREAT

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing: 11 January 2001 (11.01.01)	
International application No.: PCT/ZA00/00123	Applicant's or agent's file reference: PC/ZA00/F217
International filing date: 06 July 2000 (06.07.00)	Priority date: 06 July 1999 (06.07.99)
Applicant: MORGAN, Dave, Hedley et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International preliminary Examining Authority on:

04 October 2000 (04.10.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer:

J. Zahra

Telephone No.: (41-22) 338.83.38